

**CALIFORNIA ENERGY COMMISSION**

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**STATE OF CALIFORNIA  
ENERGY RESOURCES CONSERVATION  
AND DEVELOPMENT COMMISSION**

**Docket No.: 99-CEO-VOL-1**

**Staff Proposed Outline:  
2002-2012 Electricity Outlook Report**

**STAFF PRESENTATION**

**Electricity and Natural Gas committee Workshop**

**September 21, 2001**

# **CEC Staff Proposed Scope of**

## ***2002-2012 Electricity Outlook Report***

*Electricity and Natural Gas Committee Workshop*

September 21, 2001

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# Report Goals

- Information
  - objective and timely
  - analysis, not advocacy
  - focused, non-duplicative, based on expertise
- Insight
  - government policy choices
  - implications of alternative actions

# Load - Resources Balancing Criteria

- State and local growth and development
- Protection of public health and safety
- Preservation of environmental quality
- Maintenance of a sound economy
- Conservation of resources

» *Warren-Alquist Act: Section 25305 (e)*

# Selecting Issues

- Adequacy/Reliability: Follow the Electrons
- Prices - Follow the Money
- The real market intertwines electrons and dollars in a double helix.
- Analysis must consider feedback loops.
- Our expertise is in resource analysis.

# Selecting Issues

- Current system design and operation
- Forecast trends of a baseline system
- Identify uncertainties and risk
- Define ‘decision space’ and constraints
- Identify resource issues ready for decision
- Assess where CEC can make a positive contribution

# Overall Report Outline

- Part I: The Starting Point
- Part II: Supply-Demand Scenarios
- Part III: Issues Analyses
- Part IV: Implications and Action Recommendations

# Part I: Starting Point

- Will describe current/supply demand balance and near term outlook
- What California achieved in 2001

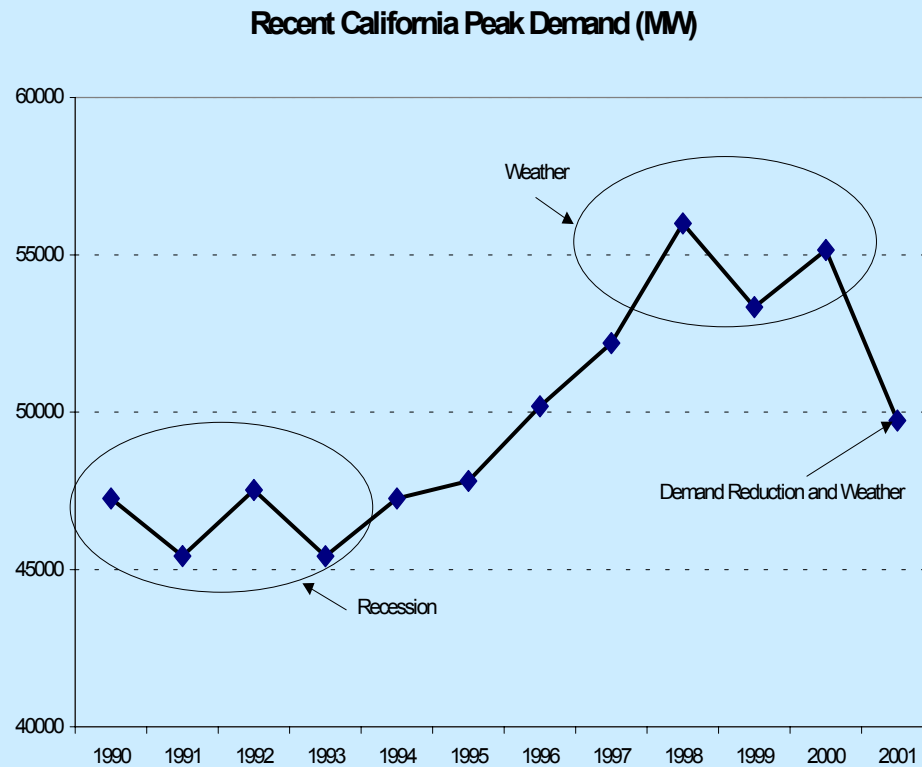


# Part II: Supply/Demand Scenarios

- II-1: Demand Scenarios
- II-2: Energy Market Simulations
- II-3: Probabilistic Reliability Assessment of  
3 Key Contingencies

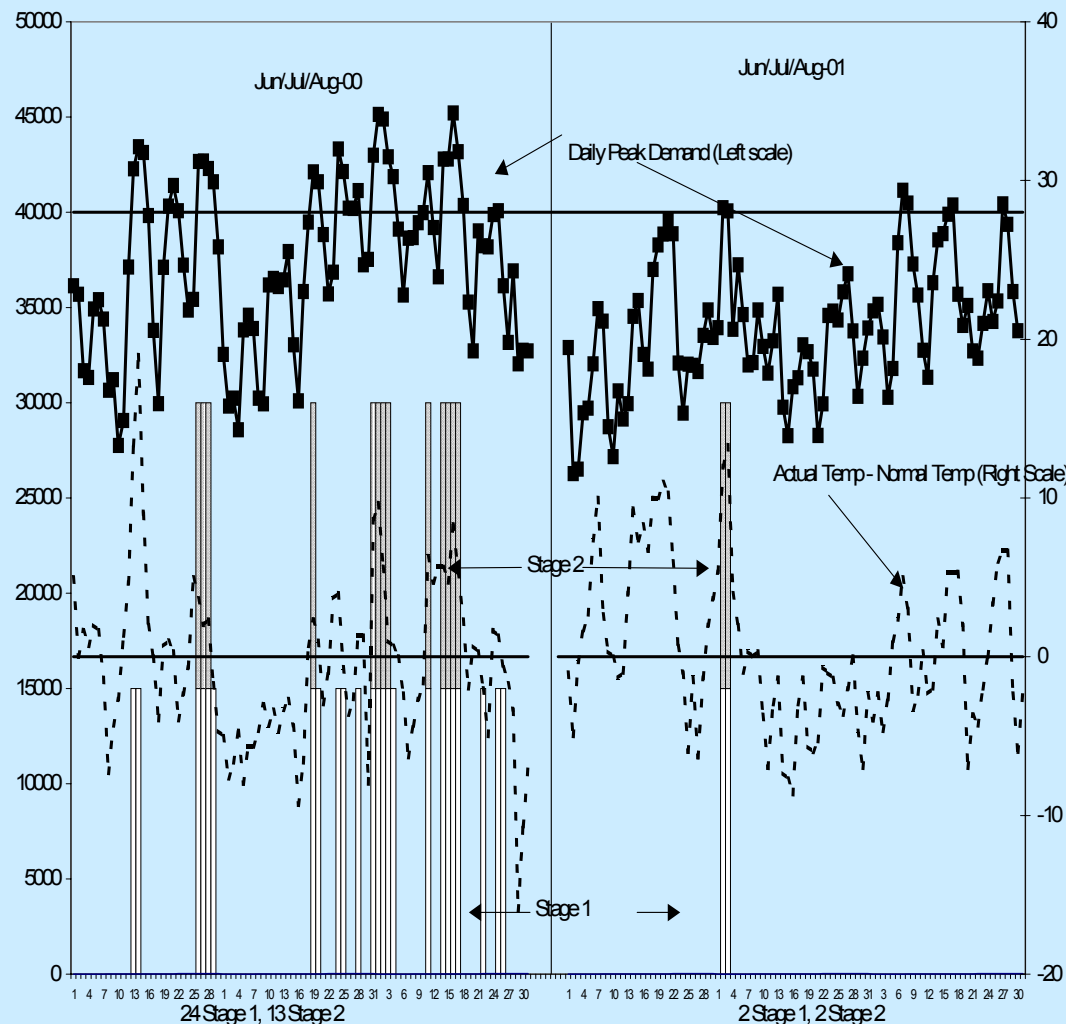
# Part II-1: Demand Scenarios

## Recent Demand Trends



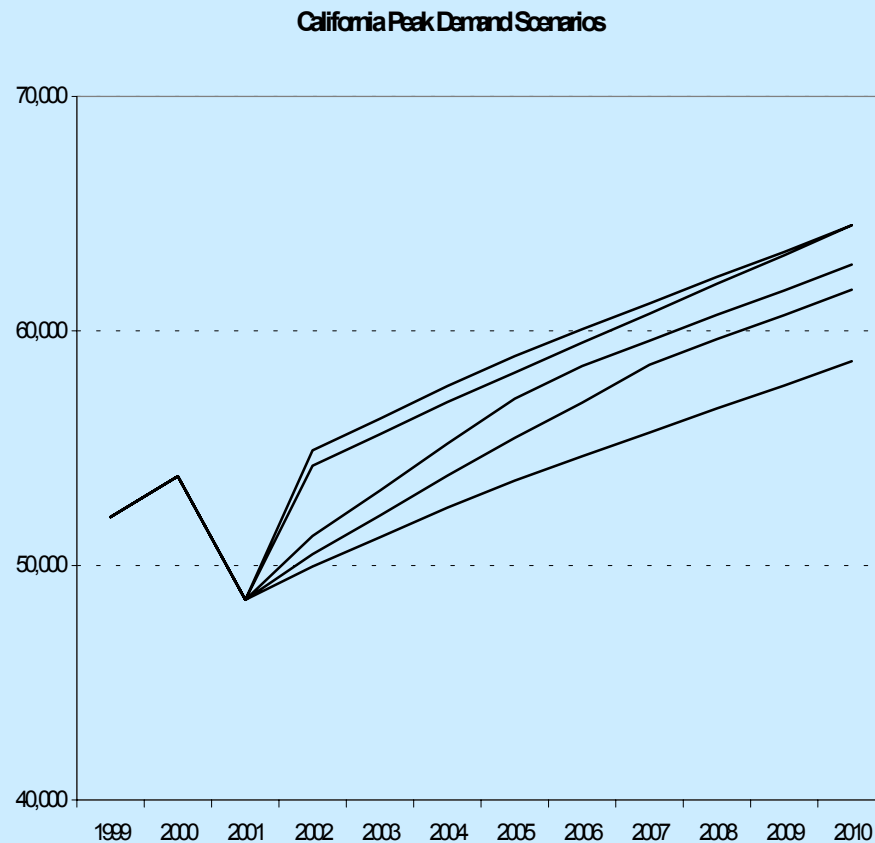
- Peak Demand a factor of economic, weather, DSM
- No growth 90's recession
- 4% growth 94-98
- Hot/cool summers late 90's
- 2001 demand reduction

# Summer 2001 - ISO Peak Demands



- Weather similar to 2000
- Economic growth in 2001
- Reduced demand levels  
2000 - 29 high demand days  
2001 - 6 high demand days
- Reduced Emergencies  
2000 - 24 Stage 1  
2001 - 2 Stage 1

# Future Demand Scenarios



- Several Components of 2001 Reduction
  - Programs
  - Prices
  - Public Awareness/Crisis
- Key Questions
  - How much is permanent or temporary?
  - Pattern of impact over time?

## **Part II-2: Energy Market Simulation Studies - Purposes of Ten-year Market Simulation**

- Provide estimate of wholesale market prices
- Test sensitivity of key variables to supply/demand assumptions
  - natural gas use
  - emissions levels
  - impact of renewable portfolio standard (RPS)

# Major Long-Run Uncertainties

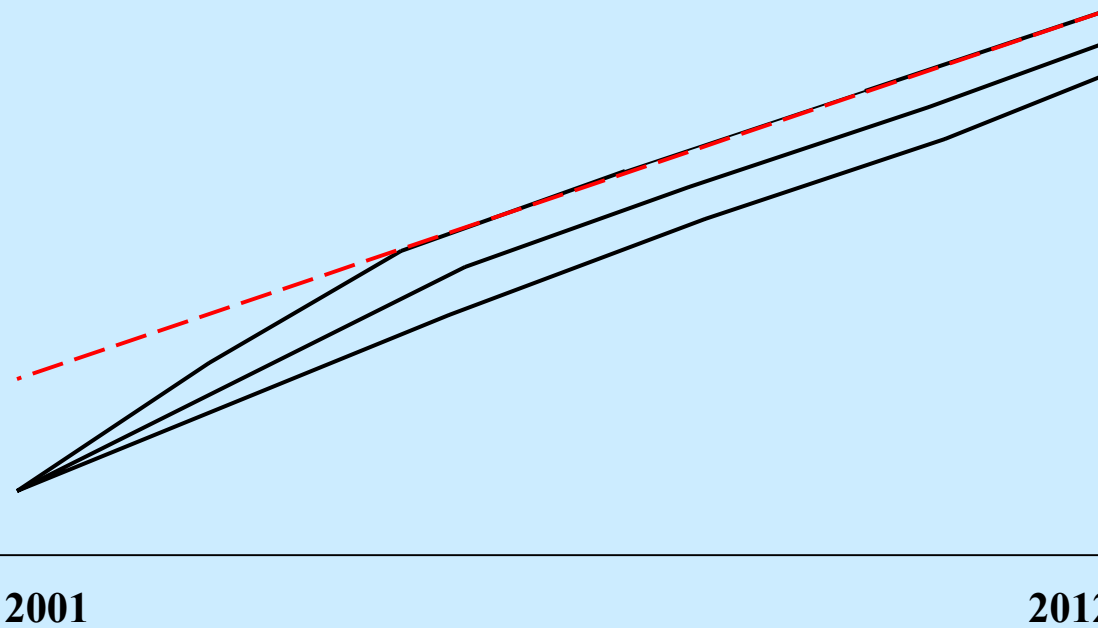
- Demand growth
- Generation additions and retirements
- Natural gas prices

# Demand Growth

- Recent reductions in demand from trend levels have transient and permanent components
  - programmatic reductions (*e.g.*, buybacks)
  - responses to higher prices
  - macroeconomic influences
  - heightened awareness/efficiency gains

# Demand Growth Scenarios

Baseline demand is approximately 2% below  
the historical trend; the “low” demand case  
has demand 4% below trend





# Gas Price Scenarios

- The price of natural gas is the predominant driver of wholesale market prices during the period simulated
- High and low gas prices estimated by the Fuels Office of the CEC differ from the baseline price estimate by XX%

## **Underlying Natural Gas Market Analysis**

- Develop a price and supply projection along with scenarios to evaluate market deviations.
  - Time Horizon will include a short-term perspective with a 2 to 5 year period (including monthly projections); and a long-term market analysis for a 10 to 20 year period.
- Preliminary long-term natural gas price and supply forecast to be released end of September 2001, with a workshop in Oct./Nov 2001 time frame.
- Scenario/sensitivity analysis to be coordinated with gas demand and electricity analysis efforts.
- Natural Gas Market Outlook Report to be published by January 2002.

# **Investigation of Gas Market Fundamentals**

## **Parameters to be considered in evaluating market deviations**

- Varying assumptions on natural gas demand and production in the United States, Canada and Mexico
- Impacts of natural gas resource and cost assumptions on wellhead prices
- Need for additional capacity on interstate and intra-California pipelines and storage to serve the market
- Short-term analysis to include seasonal variations in demand and natural gas storage levels
- Natural gas supply and price risk analysis to develop information necessary for designing reliability criteria
- Potential for LNG to serve peak natural gas demand in the state

# Additions and Retirements of Capacity

- Additions and retirements are apt to vary more than changes in demand during the coming decade. They affect wholesale market prices and emissions by altering reserve margins and system efficiency (displacement)
- Market will drive additions and retirements, but system may be over- or underbuilt at any given point in time (boom-bust cycle).
- Addition and retirements should accentuate the effects of demand growth scenarios to illustrate the full range of possible market outcomes.

# Scenarios

- Baseline Scenario
- High demand growth - low net addition - low retirement - high natural gas price scenario
  - Yields higher wholesale market prices, natural gas use, emissions
- Low demand growth - high net addition - high retirement - low natural gas price scenario
  - Yields lower wholesale market prices, natural gas use, emissions

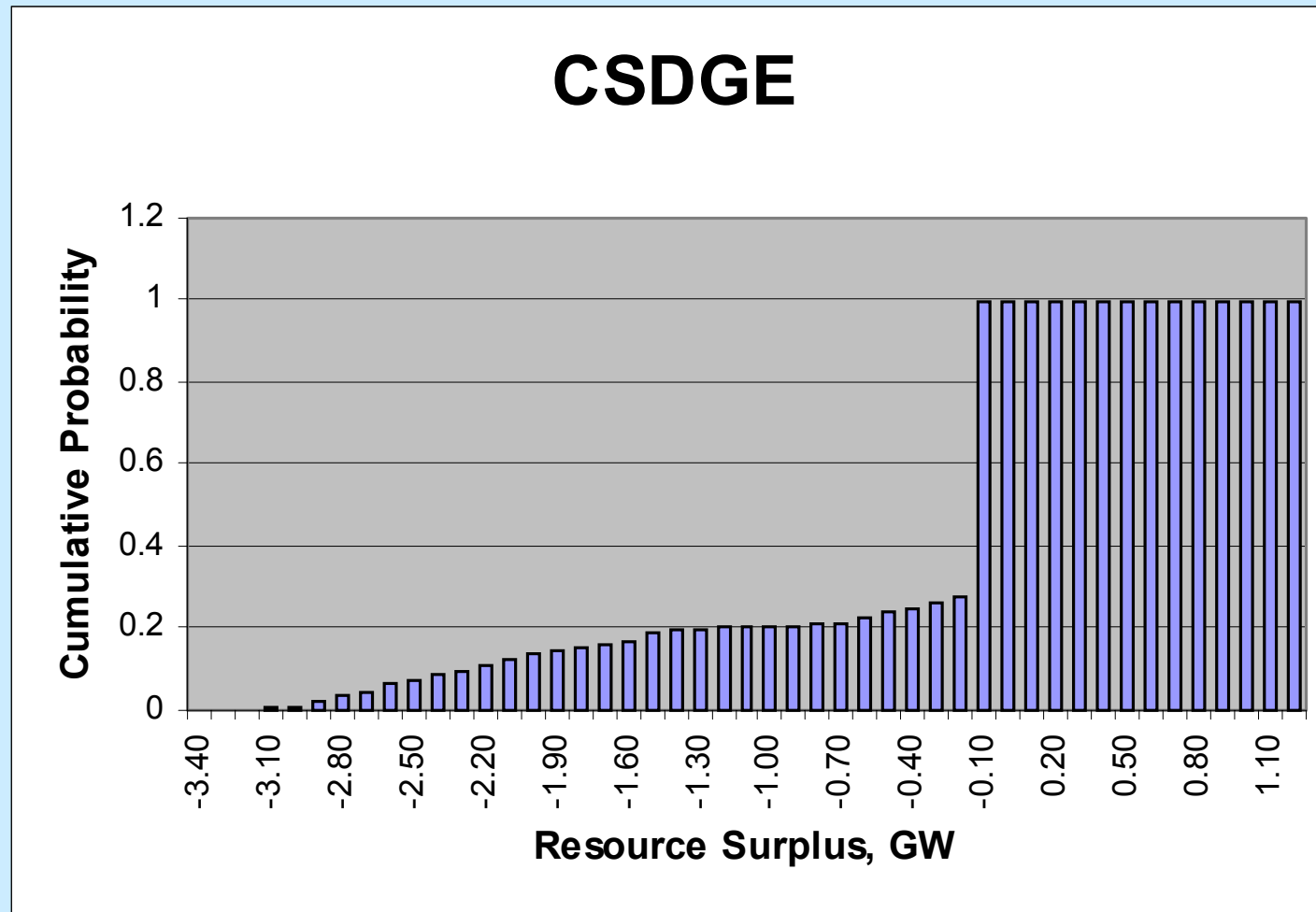
## **II-3: Probabilistic Reliability Assessment Supply Adequacy Model**

- Model developed by CEC Staff
- Purpose: To develop probabilistic risk assessments of system reliability
- Models WSCC Resources, Transmission, and Loads
- Key Output is the probability of meeting load requirements

# Analyses to be Conducted

- Impacts of Delays for New Generation
- Impacts of Increased Outage Rates for Existing Generation
- Impacts of Temperature throughout WSCC

# Sample Output of Risk Assessment





# Part III: Issues Analyses

- Part III-1: Supply Adequacy and Reliability in California
- Part III-2: Plant Life Management/Retirements
- Part III-3: Retail Electricity Price Outlook
- Part III-4: Demand Responsive Loads or Peakers?
- Part III-5: Renewable Generation Initiatives

# Supply Adequacy and Reliability in California

## **Part II-1: Supply Adequacy and Reliability in California - Overview**

- Focus on understanding the relationship between reliability and market structure
  - **What have we learned from past performance of the CA market?**
- How does market structure affect investment patterns and contribute to price volatility?
  - **Are price caps the answer? How do you structure them so as to incent investment in new generation?**
- Examine Alternative market structures
  - **Pros and cons in terms of transparent pricing and ensuring reliability**
  - **Role of the California Power Authority**

# CEC-EPRI Workshop

Nov. 7th @ CEC - Presentations by:

- Andy Ford (WSU)
  - **“Propensity of a Competitive Power Market towards Boom/Bust Cycles - Theory & Insights”**
- Stephen Lee (EPRI)
  - **“Comparison of a Competitive Power Market and a Regulated Power Authority through a Long Term Power Market Simulation Model”**

## Panel Discussions

- Objectives of a Power Market
- Means of Reducing Price Volatility in a Competitive Power Market
- Role of the Demand-Side Programs in a Competitive Power Market
- Alternative Market Structures for California

## **Part III-2: Plant Life Management Study**

- Study Objective
  - from a societal point of view, identify generation units that have operational and environmental impacts that would make them potential candidates for retirement, retrofit or replacement through 2004
  - identify where social and private interests might intersect
  - identify relevant policy incentives or options

# Screening Analysis Criteria

- Reliability Factors
  - Maintenance and Forced Outage Rates
  - Current Must Run Contract
  - Generation Constrained Area
  - Transmission Constrained Area
  - Proximity to proposed new generation
  - Age
  - Projected Reserve Margins

# Screening Analysis Criteria (cont'd)

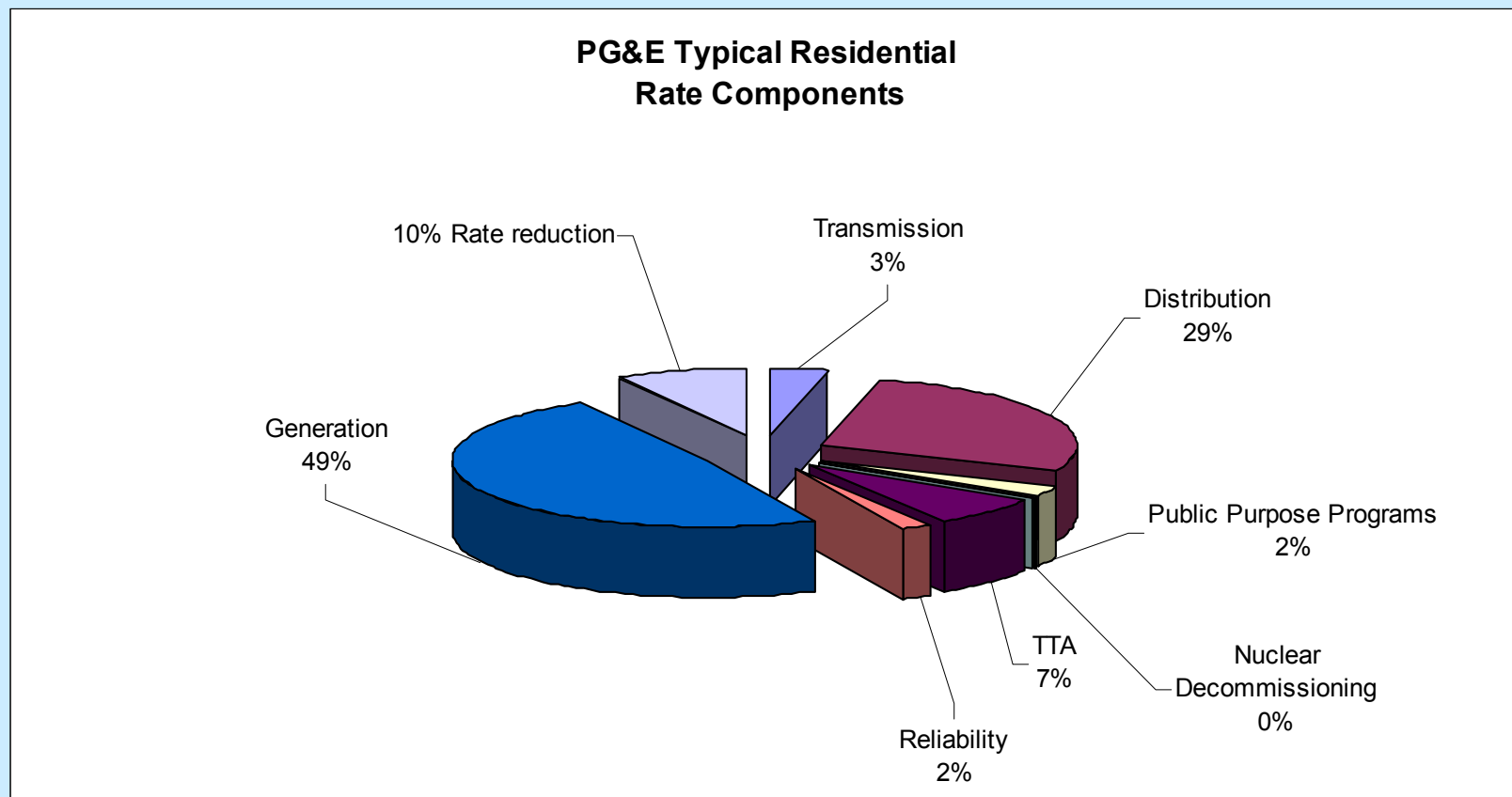
- Environmental Factors
  - NO<sub>x</sub> generated on an annual basis
  - Cooling method
  - Water source for cooling
  - Plant scheduled for modification to reduce NO<sub>x</sub> emissions

## Part III-3: Retail Electricity Price Outlook 2002-2012

**Objective:** Develop annual average retail electricity prices for “typical” customers of PG&E, Edison, SDG&E (IOUs) and LADWD, SMUD, Burbank, Pasadena and Glendale (municipal) utilities.



# Components of Retail Prices



# Sample of Inputs Considered

- Utility Retained Generation (IOUs)
- QF and Long Term Contracts (IOUs)
- Fuel Cost Adjustments (Munis)
- Rate Stabilization Funds (Munis)
- DWR Contract Costs (IOUs)
- Spot Market Purchases (IOUs/Munis)
- CPUC (for IOUs) and Boards (for Munis)

Decisions.

## **Part III-4: Fork In The Road: Peakers Vs. Demand Response**

- California has sufficient resources to cover load and supply contingencies for normal weather in 2002-2004.
- Extreme weather, especially Westwide, could threaten reliability.
- What is the best mix of peakers and demand response to cover these unusual conditions?

## **Fork In The Road:**

### **Peakers Vs. Demand Response (cont'd)**

- Considerations in rational decision-making:
  - uncertainty in achieving goals
  - cost (and funding restrictions, if any)
  - performance of units versus programs
  - flexibility
  - corollary benefits or costs

## **Fork In The Road:**

### **Peakers Vs. Demand Response (cont'd)**

- Status of peaker strategy
  - advocated by CPCFA spokespersons
  - CPCFA Investment Plan due by 2/2002
  - CPCFA decisions may precede Investment Plan
  - CPCFA funding through bond authority requires revenue stream for bond repayment
  - unclear to what extent CPCFA contracts create net increase in peaking facility capacity

## **Fork In The Road:**

### **Peakers Vs. Demand Response (cont'd)**

Status of demand response strategy:

- program design and funding authority among agencies is in “total disarray”
- CPUC has launched Phase 2 of R.00-10-002 addressing UDC programs for “2002 and beyond”
- RTP tariff designs have been filed with CPUC
- 13,000 MW of load will have RTP metering systems

# Part III-5: Renewable Generation Initiatives

- Developers of new renewable energy projects currently face a high degree of uncertainty.
- The single biggest impediment to further development of renewable projects, however, is the lack of a stable market and buyers willing to provide adequate price certainty.
- The report will describe the current impediments and discuss the prospects for improvement that might result from a variety of potential market developments.

## Part III-6: Siting and Transmission

- Powerplant Development in the Restructured Industry
  - Powerplants in Operation or under Construction
  - Powerplants Applications Under Review
  - Expected Future Trends
- Constraints for New Powerplant Development
  - Air Quality
  - Water Quality and Supply
  - Biological Resources
  - Environmental Justice
  - Other Environmental Issues
  - Transmission Line Constraints and System Reliability Issues
  - Fuel Availability and Diversity
  - Technology Innovations



# Siting (cont'd)

- Siting Review Process
  - Legislative Initiatives and Regulatory Changes (AB 970 SB 28x)
  - Emergency Siting Process
  - 4-Month Siting Process
  - 6-Month Siting Process
  - Small Power Plant Exemptions
  - 12-Month Siting Process
- Initiatives to Address Siting Constraints
  - Siting Process Improvements
  - Environmental Policies and Mitigation Strategies
- Conclusions and Recommendations

# Part IV: Implications and Action Recommendations

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